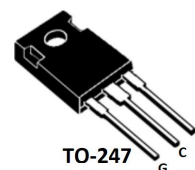


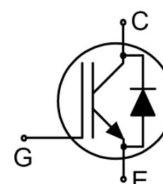
Features

- Low gate charge
- Trench FS Technology
- RoHS product



Applications

- General purpose inverters
- Induction heating(IH)
- UPS



Absolute Ratings (T_c=25°C)

| Parameter | Symbol | Value | Unit |
|---|-------------------------------------|----------|------|
| Collector-Emmitter Voltage | V _{CES} | 1200 | V |
| *Collector Current-continuous | I _c T=25°C T=100°C | 30 | A |
| | | 15 | A |
| Collector Current-pulse(note 1) | I _{CM} | 45 | A |
| Diode Continuous forward current | I _F T=25°C T=100°C | 30 | A |
| | | 15 | |
| Diode Maximum Forward Current (Note 1) | I _{FM} | 45 | A |
| Gate-Emmitter Voltage | V _{GES} | ±20 | V |
| Power Dissipation(TO-247) | P _D T _C =25°C | 238 | W |
| Operating Temperature Range | T _J | -40~+175 | °C |
| Storage Temperature Range | T _{STG} | -55~+150 | °C |
| Maximum Lead Temperature for Soldering Purposes | T _L | 300 | °C |

*Collector current limited by maximum Junction temperature

Electrical Characteristic(T_C=25°C unless otherwise noted)

| Parameter | Symbol | Tests conditions | Min | Typ | Max | Units |
|-------------------------------------|-------------------|---|------|-----|-----|-------|
| Off-Characteristics | | | | | | |
| Collector-Emmitter Voltage | BV _{CES} | I _C =250μA, V _{GE} =0V | 1200 | - | - | V |
| Zero Gate Voltage Collector Current | I _{CES} | V _{CE} =1200V, V _{GE} =0V, T _C =25°C | - | - | 100 | uA |
| | | T _C =100°C | - | - | 2 | mA |

| | | | | | | |
|--|--------------|---|-----|------|-----------|----|
| Gate-body leakage current,reverse | I_{GESR} | $V_{CE}=0V, V_{GE}=\pm 20V$ | - | - | ± 150 | nA |
| On-Characteristics | | | | | | |
| Gate-Emmitter Threshold Voltage | $V_{GE(th)}$ | $V_{CE}=V_{GE}, I_c=250\mu A$ | 4.5 | - | 6.5 | V |
| Collector-Emmitter saturation Voltage | V_{CESAT} | $V_{GE}=15V, I_c=15A, T_c=25^\circ C$ | - | 1.6 | 2.1 | V |
| | | $T_c=125^\circ C$ | - | 1.9 | - | V |
| | | $T_c=150^\circ C$ | - | 2.1 | - | V |
| Dynamic Characteristics | | | | | | |
| Input capacitance | C_{ies} | $V_{CE}=25V, V_{GE}=0V, f=1.0MHz,$ | - | 1260 | - | pF |
| Output capacitance | C_{oes} | | - | 78 | - | pF |
| Reverse transfer capacitance | C_{res} | | - | 41 | - | pF |
| Total Gate Charge | Q_g | $V_{CC}=960V, I_c=15A, V_{GE}=15V^{3,4}$ | - | 112 | - | nC |
| Gate to emitter charge | Q_{ge} | | - | 8.8 | - | |
| Gate to collector charge | Q_{gc} | | - | 80.7 | - | |
| Switching Characteristics | | | | | | |
| Turn-On delay time | $t_d(on)$ | $V_{CE}=600V, I_c=15A, R_G=10\Omega, Inductive load T_c=25^\circ C$ | - | 10 | - | ns |
| Turn-On rise time | t_r | | - | 34 | - | ns |
| Turn-off delay time | $t_d(off)$ | | - | 52 | - | ns |
| Turn-off Fall time | t_f | | - | 174 | - | ns |
| Turn-on energy | E_{on} | | - | 0.38 | - | mJ |
| Turn-off energy | E_{off} | | - | 0.67 | - | mJ |
| Total switching Energy | E_{tot} | | - | 1.05 | - | mJ |
| Anti-Paraller Diode Characteristics and Maximum Ratings | | | | | | |
| Diode Forward Voltage | V_F | $V_{GE}=0V, I_F=15A.$ | - | 1.85 | 2.2 | V |
| Diode Reverse recovery time | t_{rr} | $V_{GE}=0V, V_R=600V, I_F=15A, dl_F/dt=450A/us^4$ | - | 283 | - | ns |
| Reverse recovery charge | Q_{rr} | | - | 1180 | - | nC |

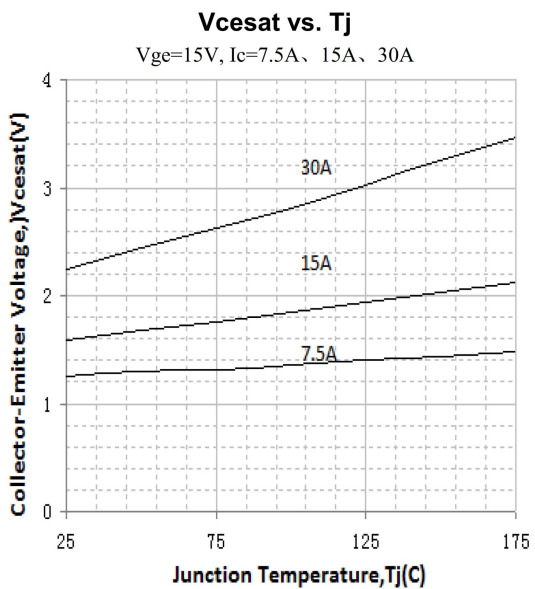
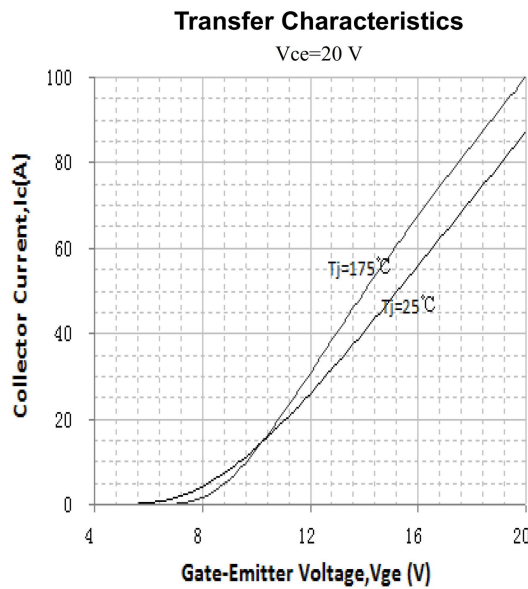
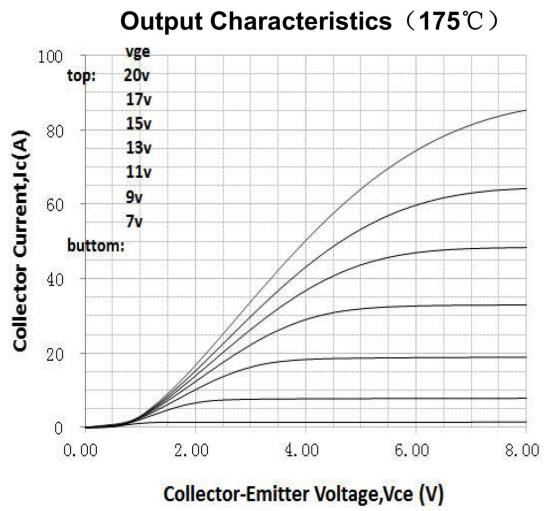
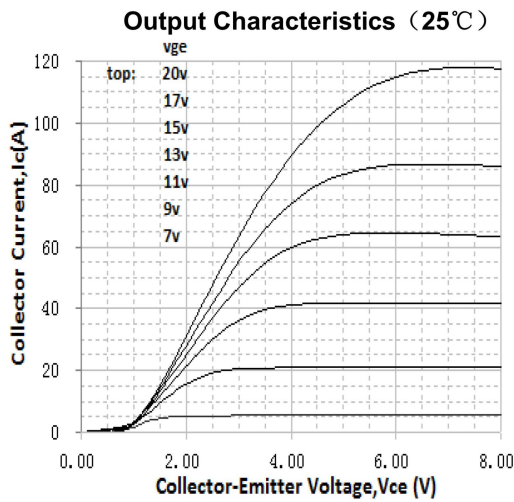
Thermal Characteristics

| Symbol | Parameter | Type | Units |
|--------------|---|------|--------------|
| $R_{th j-c}$ | Thermal Resistance, Junction to case | 0.63 | $^\circ C/W$ |
| $R_{th j-a}$ | Thermal Resistance, Junction to Ambient | 40 | $^\circ C/W$ |

Notes:

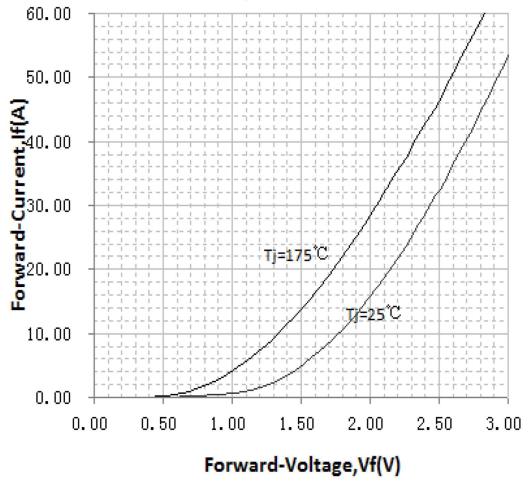
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 4: Essentially independent of operating temperature

Electrical Characteristics (curves)



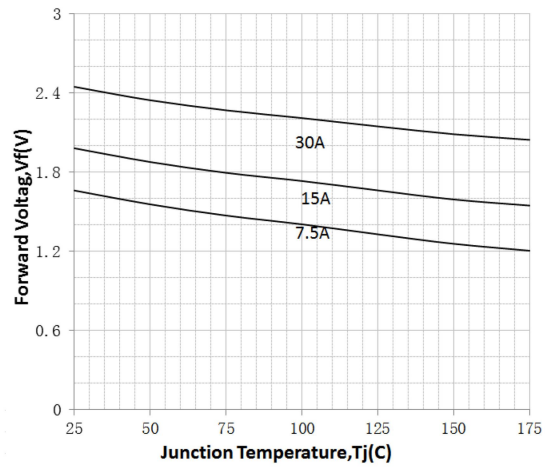
Diode Characteristic

$T_j=25^{\circ}\text{C}, 175^{\circ}\text{C}$



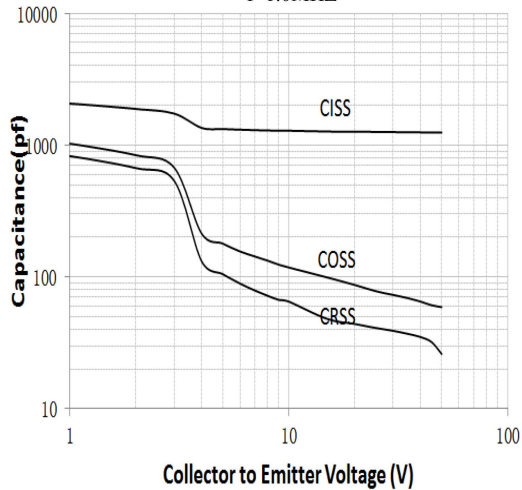
V_f vs. T_j

$I_c=7.5\text{A}, 15\text{A}, 30\text{A}$



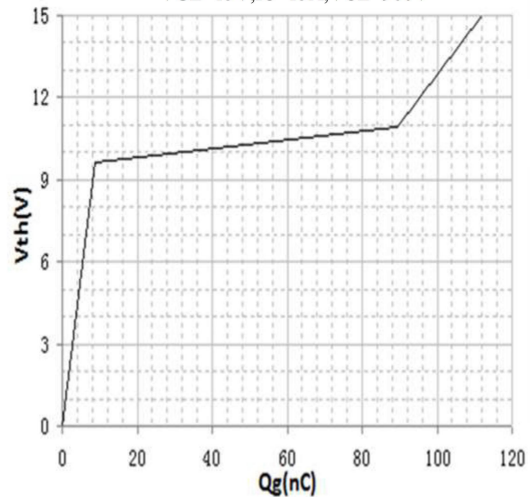
Capacitance Characteristic

$f=1.0\text{MHz}$



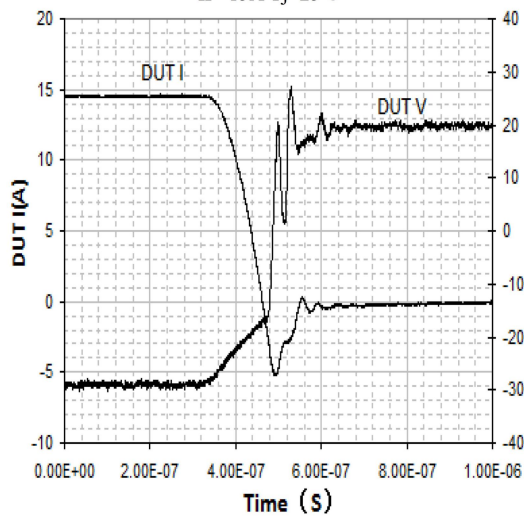
Gate Charge Characteristics

$V_{GE}=15\text{V}, I_c=15\text{A}, V_{CE}=960\text{V}$



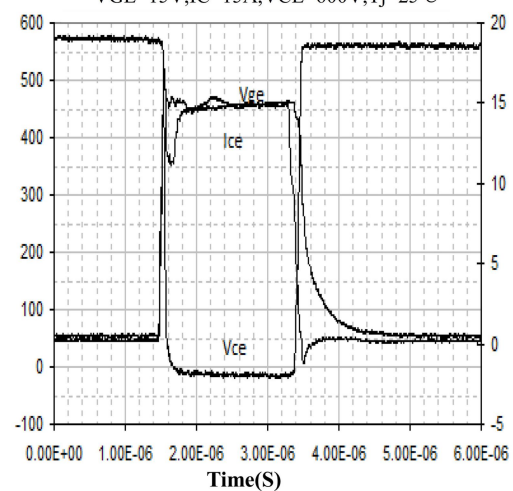
Diode Peak Reverse Recovery Current

$I_F=15\text{A}, T_j=25^{\circ}\text{C}$



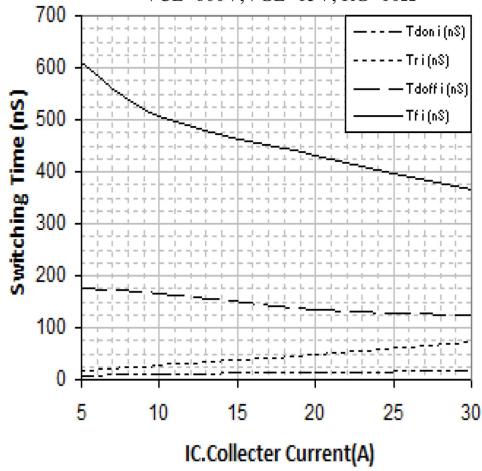
IGBT Switch

$V_{GE}=15\text{V}, I_c=15\text{A}, V_{CE}=600\text{V}, T_j=25^{\circ}\text{C}$



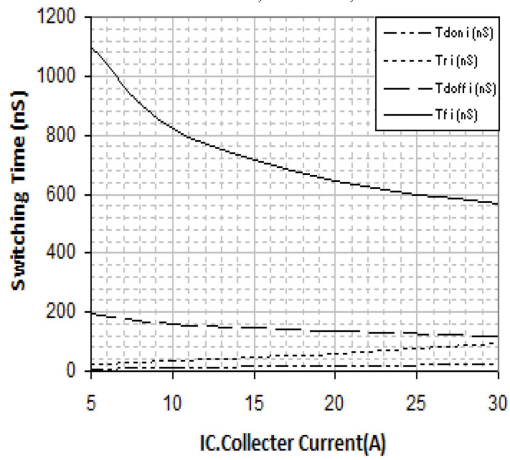
Switching Time vs. IC(25°C)

VCE=600V, VGE=15V, RG=10Ω



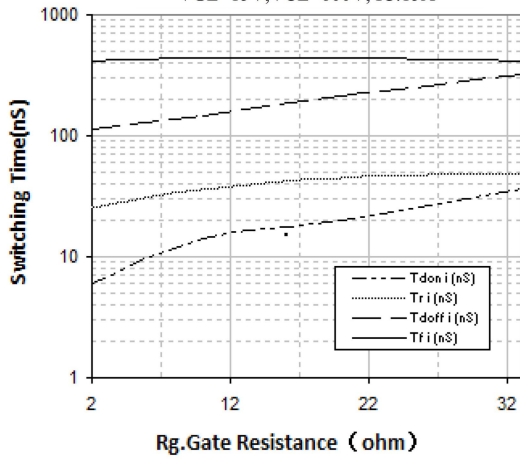
Switching Time vs. IC(175°C)

VCE=600V, VGE=15V, RG=10Ω



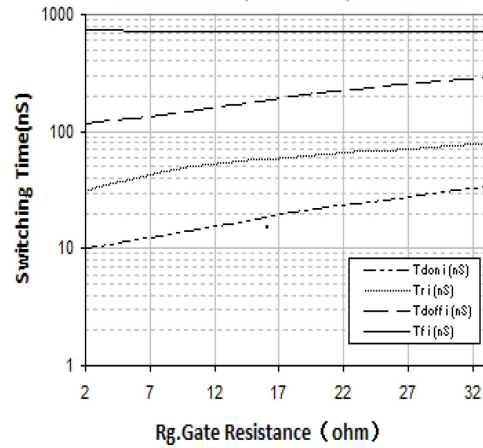
Switching Time vs. Rg(25°C)

VGE=15V, VCE=600V, IC=15A



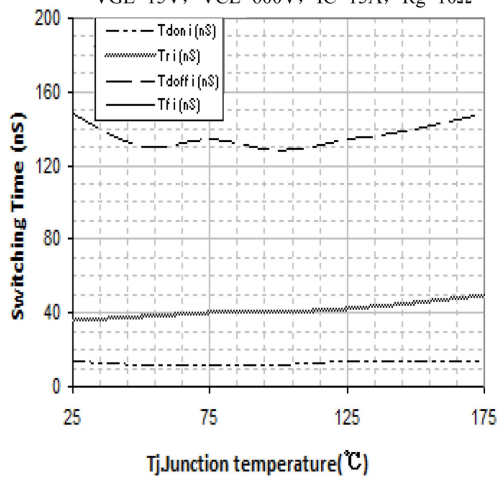
Switching Time vs. Rg(175°C)

VGE=15V, VCE=600V, IC=15A



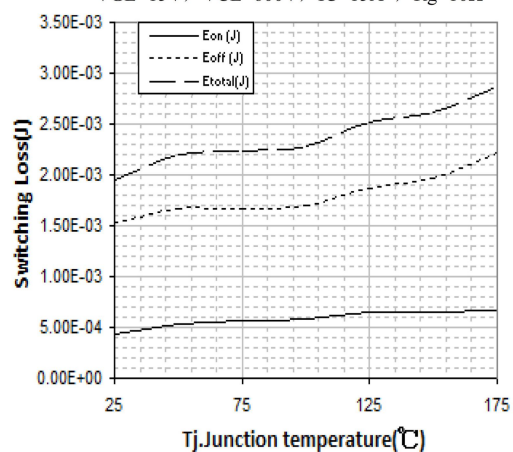
Switching Time vs. Tj

VGE=15V, VCE=600V, IC=15A, Rg=10Ω



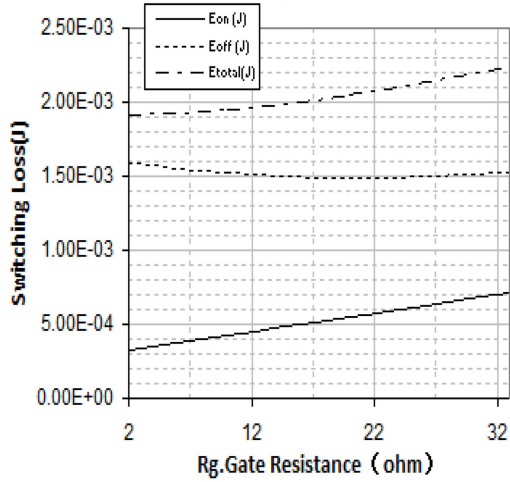
Switching Loss vs. Tj

VGE=15V, VCE=600V, IC=15A, Rg=10Ω



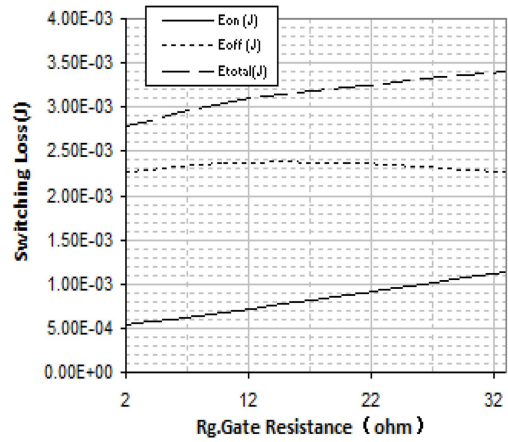
Switching Loss vs. Rg(25°C)

VGE=15V, VCE=600V, IC:15A



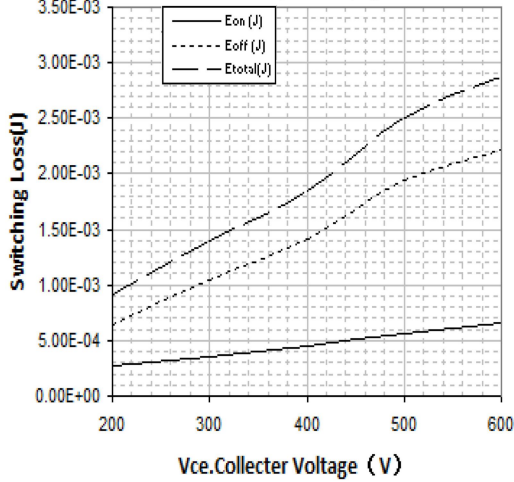
Switching Loss vs. Rg(175°C)

VGE=15V, VCE=600V, IC:15A



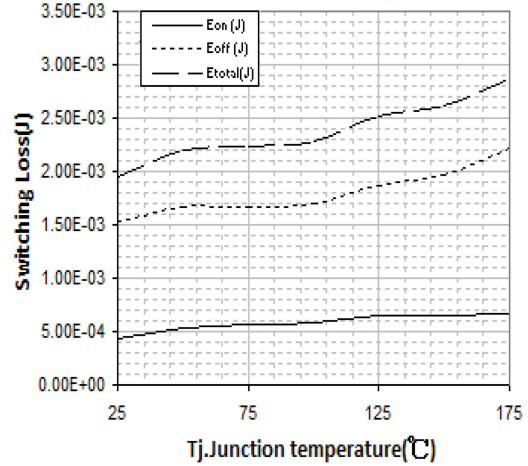
Switching Loss vs. VCE(175°C)

VGE=15V, IC:15A, Rg=10Ω



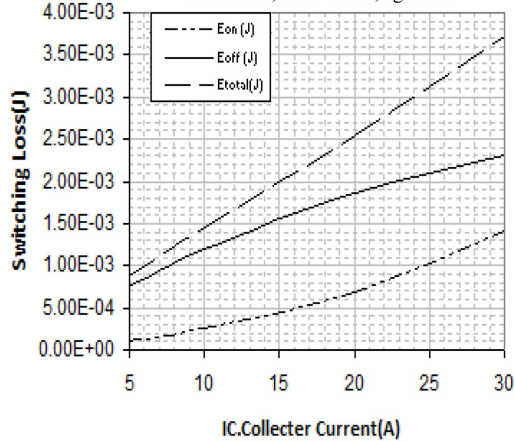
Switching Loss vs. Tj

VGE=15V, VCE=600V, Rg=10Ω



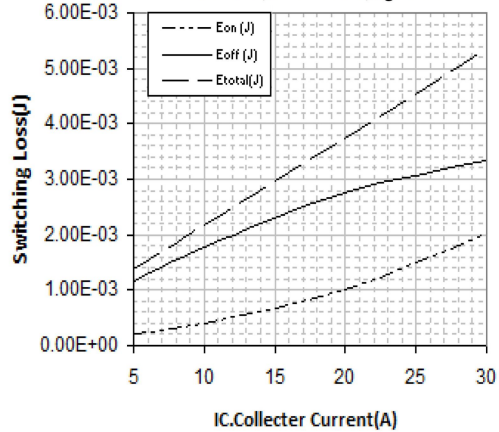
Switching Loss vs. IC(25°C)

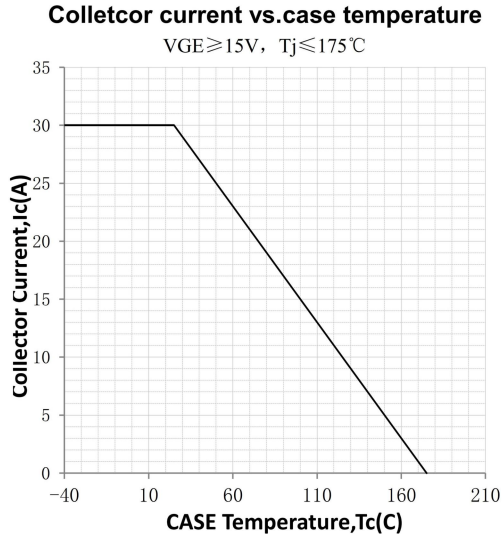
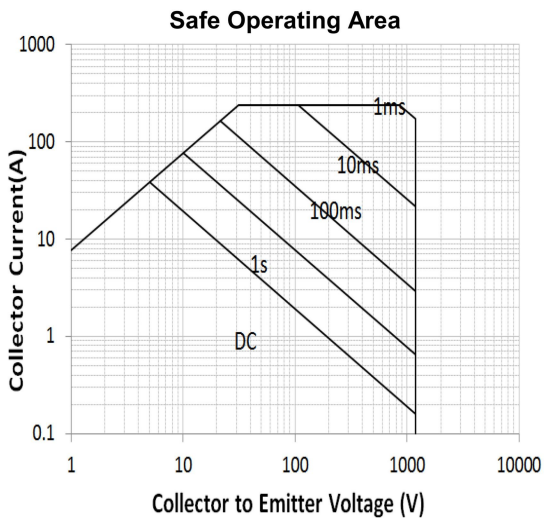
VGE=15V, VCE=600V, Rg=10Ω



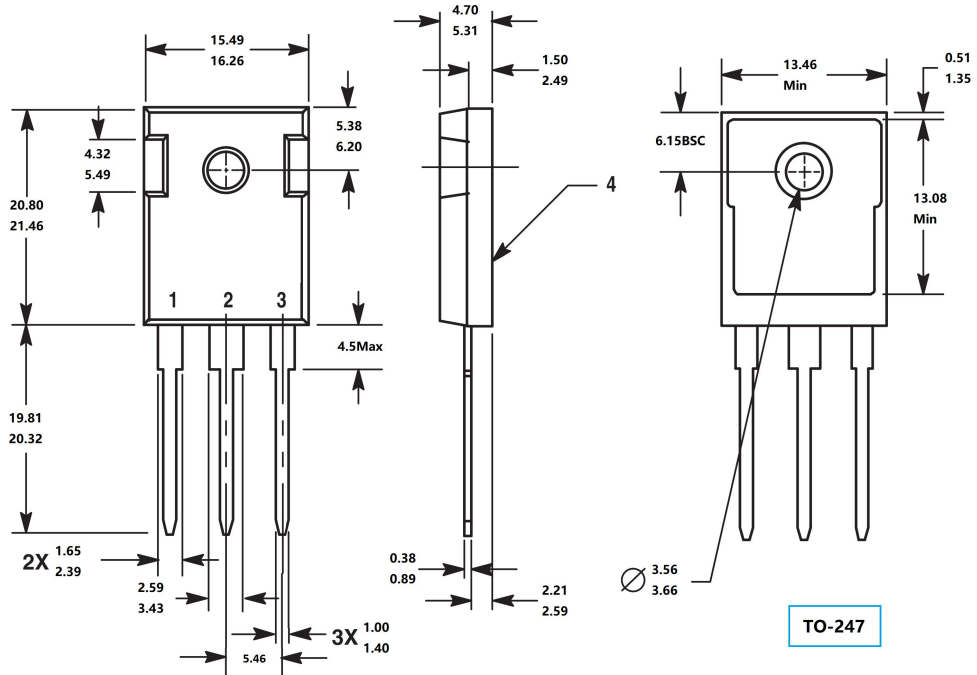
Switching Loss vs. IC(175°C)

VGE=15V, VCE=600V, Rg=10Ω





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